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The purpose of this research is to add to the understanding of organizational goals, personal value systems and operative goals of professionals in a research and development organization. It also investigates the impact of motivation in productivity with emphasis on the behavioral concept. In addition, the general thrust of this research is the establishment of a hierarchy of operative goals and personal values with an examination of congruence in the ranking of the concepts among the sub-sets of professionals within the organization: and determination of the primary orientation of the professionals.

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20. Abstract (cont'd)

These findings are then used to identify the value concepts and operative goals that have the greatest behavioral relevance.

Statistically significant differences were found in the ranking of and the behavioral relevance scores to the point that conflicts were evidenced between professional groups. Literature dealing with the concepts did not always indicate agreement with the findings, however, some studies supported scientist dissatisfaction in applied research oriented organizations. This research would, therefore, provide an excellent starting point for further studies into employee concepts and their relationship to job satisfaction and employee motivation.

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ATTITUDES OF RESEARCH AND DEVELOPMENT
PROFESSIONAL FEDERAL EMPLOYEES TOWARD
VALUE SYSTEMS AND OPERATIVE GOALS: A
STUDY OF SCIENTISTS, ENGINEERS AND
MANAGERS AT A FEDERAL INSTALLATION.

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HUMAN FACTORS BRANCH

JUNE   1977

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ATTITUDES OF RESEARCH AND DEVELOPMENT PROFESSIONAL
FEDERAL EMPLOYEES TOWARD VALUE SYSTEMS AND OPERATIVE GOALS:

A STUDY OF SCIENTISTS, ENGINEERS AND MANAGERS
AT A FEDERAL INSTALLATION

———————————

A RESEARCH PAPER
PRESENTED TO

The Department of Advanced Programs
The University of Oklahoma

———————————

In Partial Fulfillment
of the Requirements for the Degree
Master of Public Administration

———————————

by

Gerald G. Silverman

PREFACE

This study is in an area that became of great interest while studying Public Personnel Administration and Organizational Theory under Dr. Albert H. Rosenthal, Professor of Political Science, University of New Mexico and Dr. Deil S. Wright, Professor of Political Science, Research Professor, University of North Carolina (Chapel Hill). It was found that there was limited empirical data available to management concerning employee value concepts and their relationship to organizational goals. It was felt, therefore that this study might add to the knowledge available.

Appreciation and sincere thanks are extended to Dr. (Lt. Col) T. Roger Manley, Assistant Professor of Systems Management, School of Engineering, Air Force Institute of Technology, Wright Patterson Air Force Base for his time and effort reviewing the draft, allowing the use of this questionnaire, providing computer programs, and answering many questions. I would also like to thank Dr. Walter F. Scheffer, Director, Graduate Programs in Public Administration, University of Oklahoma for his constructive criticism and support in this project. To Miss Elizabeth Bell goes the author's most sincere thanks for her typing of the draft and final manuscript.

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ABSTRACT

The purpose of this research is to add to the understanding of organizational goals, personal value systems and operative goals of professionals in a reserach and development organization. It also investigates the impact of motivation in productivity with emphasis on the behavioral concept. In addition, the general thrust of this research is the establishment of a hierarchy of operative goals and personal values with an examination of congruence in the ranking of the concepts among the sub-sets of professionals within the organization; and determination of the primary orientation of the professionals. These findings are then used to identify the value concepts and operative goals that have the greatest behavioral relevance.

Statistically significant differences were found in the ranking of and the behavioral relevance scores to the point that conflicts were evidenced between professional groups. Literature dealing with the concepts did not always indicate agreement with the findings, however, some studies supported scientist dissatisfaction in applied research oriented organizations. This research would, therefore, provide an excellent starting point for further studies into employee concepts and their relationship to job satisfaction and employee motivation.

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MANAGERS AT A FEDERAL INSTALLATION

I. INTRODUCTION

BACKGROUND:

For the 30 years prior to the 1950's researchers, in their study
of work, had been primarily concerned with the psychological function of
the worker. In the past, psychologists and researchers from other
disciplines had been mainly concerned with the determination of the
relationship between various psychophysical and physical character-
istics and productivity (Schaffer, 1953). As we moved out of the
psychophysical era into the 1950's, there began a change in direction
of thought with a shift from emphasis on the psychophysical to the
emotional aspects of worker behavior. This new concept said that the
variable of job satisfaction and productivity appear to be artifacts
of each other.

It became recognized that in order to provide creative, con-
structive, satisfying and productive reactions among workers, it is
imperative that we learn to manage our workday affairs so as to
satisfy the social and emotional needs of people. We must perceive
the nature of man and his psychological problems and attempt to re-
solve these problems to allow him to apply his energies to creativ-

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ity and work. In order to achieve this end, Man must be directed toward his goal through the motivational process which, in itself, is one of the major determinants of productivity.

At the same time, juxtapositioned with the concept of meaningful emphasis placed on the spectrum of productivity, is the belief of the importance of the individual within the organization. The structure of the organization represents a large contributing factor to efficiency in work performance. Vroom (1964) argues two major assumptions:

(1) Performance of a person is to be understood in terms of motives (or needs or preferences) and the condition for their satisfaction in the work situation. The level of performance of the worker for a task or job is a direct function of his motivation to perform effectively.

(2) The performance of a person is to be understood in terms of ability and relevance to the task performed or, the level of performance of a worker on a task or job in a function of his ability to perform that task.

The latter is a dependent function supportive if we consider training, measurement of abilities and selection according to ability. However, the former is also a directly dependent function. Thus making both dependent functions of a worker's level of performance, yet both representing different functions, e.g., capacity to work; will to work. Thus we hypothesize that performance is a direct function of ability, motivation, and work method effectiveness, the latter being strict engineering concept and the first two being be-haviorist concepts.

In order to take the full perspective of the problems surrounding worker performance, one must include the study of personal value systems as a fourth variable in the prediction of job satisfaction. In essence, the worker's satisfaction with his job or anticipated satisfaction with an occupation results from the instrumentality of the job attaining the required outcomes. The key to the development of a well planned management system is a well developed individual planning process that can only be accomplished under a well run merit system. This system must incorporate job enrichment programs and planned rotation to higher managerial positions. It has become obvious that merit is an explicit need for challenges in the job environment. Thus, the basic concept of job enlargement is based on growth or motivation factors intrinsic to the job.

It become apparent from research (Lawler, 1970; Wanous and Lawler, 1972; Wernimont, 1966; Woffard, 1971; Goodman, Rose and Furcon, 1970; Graen, 1969, and Porter and Duben, 1975) that the distinguishing characteristic of the concept of motivation is that it is goal-directed and that motivational behavior is that which is under central or voluntary control. Lawler (1973:4) maintains that "in examining goal-directed behavior, one must consider both what energizes the behavior and what directs behavior toward the goal."

There is a tendency among managers to confuse theories of motivation and theories that concern themselves with specifying the nature of human needs or drives. In order to separate the two theories it is important to realize that those theories applicable to

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human needs to drives are geared to deal only with why outcomes such as pay, promotion, and job security are wanted while any other outcomes are ignored. Conversely, the theory of motivation is an attempt to provide an explanation, as well as a prediction of behavior. As a part of the explanation and prediction of behavior, not only must those factors or needs and drives be stated, but also the influencing factors of how they are sought.

Most studies of the internal operation of complex organizations, if they mention goals at all, have taken official statements of goals at face value. According to Perrow (1961) the type of goals most relevant to understanding organizational behavior are not the official goals, but rather those that are embedded in major operating decisions of personnel. In addition, these goals are shaped by the particular problems or tasks organization must emphasize inasmuch as these tasks determine the characteristics of those who will dominate the organization.

The structure of the organization represents a large contributing factor to the efficiency in work performance. It also contributes, to a degree, the success of motivational programs. There have been many arguments over management methodology. It has been clearly established, however, that under proper conditions the flexible structure of organizational management provides encouragement to people to direct their creative energies toward organizational objectives, given them some voice in the decisions that effect them and provide significant opportunities for the satisfaction of social and egoistic needs (Roach and Davis, 1973; Weiss and Sherman, 1973;

McGregor, 1966). It is under these circumstances that an organization stays viable and it is only through its members that an organization can remain organic and adaptive (Manley, et al, 1974).

Purpose:

The purpose of this reserach is to examine the work done by Manley and Pittenger (1974) and to compare their approach by assessing the personal value systems and operative goals of managers, scientists and engineers as derived from England's (1967) personal value model. At the present time, very little research has been done in the study of personal values by students of organizational behavior. England (1967) defines personal value systems as "a relatively permanent perceptual frame work which shapes and influences the general nature of an individual's behavior". Looking at this in another way, the personal value system is the concept of an intervening psychological process whereby the individual forms preceptions of the situation based upon the interaction between perceived organizational attributes and individual characteristics. This system is given the name "psychological climate" (James, et al, 1975) and is defined by James and Jones (1974) as:

> . . . .a set of second order abstractions of intervening variables or first order constructs depicting internal representations of prevailing conditions of the organizational environment as related to characteristics of the job, the leadership, the work group, and the various subsystems and the total organization.

What is important here is the conception, either explicit or implicit of what an individual (or organization) perceives to be satisfactory. It is not a unitary construct such as "restrictiveness of structure"

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or "friendliness and warmth of the work environment", although these value dimensions may be included. Rather the key to conceptualizing the personal value is the assumption of a second order abstraction which, although based on known dimensions, provides a more explanatory description of the perceived organizational situation and relates how the general nature of individual behavior is influenced. The emphasis on "general nature" is relevant to avoid overlooking situational factors.

The assumed properties of personal values are predicated upon the nature of perception, namely that the perceptions of the organizational environment are based upon an intervening psychological process and a situational interaction. Assumptions relative to the relationships between personal values and other variables can also be made. As an example, a personal value is an individual attribute and, therefore, there is no requirement that perceptions be either accurate or that they be highly correlative with situational measures. Moreover, there exists no requirement that the perception of individuals in the same situation have to agree; however, the behavioral relevance of specific value concepts is effected, to some degree, by situational considerations. There is also an assumption to be made to the effect that personal value concepts are dynamically related to job attitudes and job satisfaction but are not redundantly in one relationship. It is also assumed that personal value concepts are translated by the individual into a set of expectancies, attitudes and behavior where personel value concepts may act as either a direct causal agent or moderate the relationships between objective

situational measures and individual behaviors and attitudes (James, et al, 1974). In short, the personal value concepts of an individual are an indicator of how that individual evaluates information and how he arrives at decisions (Taguri, 1965).

The Organization Surveyed

In the effort to gather the data presented in this paper, several units of the engineering and scientific community of the U.S. Army Electronics Command (ECOM), Fort Monmouth, NJ were surveyed. The largest engineering community within ECOM is the Directorate of Research Development and Engineering (RD&E) which is comprised of several commodity laboratories. Research, Development and Engineering is responsible for planning, engineering and managing development testing and acquisition of all ECOM mission equipment. Research, Development and Engineering employs approximately 1,350 civilian scientists and engineers.

The Electronics Command also contains two additional directorates that were considered to be large enough in terms of engineering personnel to be surveyed. These were:

(1) The Product Assurance Directorate: whose function is to assure the effectiveness of ECOM developed and/or procured material throughout the total life cycle program. This program includes, in part, reliability and maintainability engineering, human factors engineering, and quality engineering.

(2) The Directorate of Maintenance: whose function is the direction of the operation of the ECOM National Maintenance point for assigned and supported material. The Maintenance Directorate is responsible for the management of the total maintenance engineering life cycle program for assigned ECOM material.

Over 150 engineering personnel are employed in these two directorates. They represent a sizeable group of professionals in the Electronics Command, and knowledge of values and goals were necessary for this study in order to make it representative of the broad spectrum of engineers wihin ECOM as well as the wide section of Federal Government scientists and engineers.

The total population for this study consisted of approximately 1350 scientists and engineers assigned to Directorate of Research and Development, Product Assurance Directorate and Maintenance Directorate. A total sample of approximately 373 representative employees was selected. This sample was 30% of engineering and scientific personnel with 140 questionnaires completed. Successful accomplishment of this study was based on the following assumptions:

(1) The stratified sample of scientists and engineers served as a representative cross section of scientists and engineers working at ECOM.

(2) Personnel responding to the questionnaire would, on the average, be truthful in expressing their values and goals inasmuch as their anonomity would be assured.

II. SURVEY OF THE LITERATURE

Influencing Factors:

Chapter I presented a brief overview of basic concepts of personal values and organizational goals and their relationship to performance and job satisfaction of engineers and scientists. This chapter will be concerned with a more in-depth look at those factors considered to be influential in shaping the personal values of engineers and scientists.

In the public sector, as in the private sector, the payoff for a study of job attitudes is increased productivity, decreased turnover, decreased absenteeism and smoother working relations. To the individual the result would be better understanding of the forces that exert influence on attitudes which would, in turn, lead to improved morale resulting in greater happiness and self realization. The factors that influences job attitudes are two-fold and are identified as (1) on-the-job needs met primarily by the work itself, and (2) on-the-job needs of a social type. Those needs which are met primarily by work itself include the following (Silverman, 1975):

(1)   A sense of accomplishment, of getting something useful completed, of being able to tie-in individual work assignments with broader and important operations.

(2)   A sense of independence, on being on your own, of displaying initiative or imagination and of participating in meaningful decision-making.

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(3) A desire for knowledge, of being able to know why things happen and of being informed on matters of direct interest.

(4) The sense of skill or creativity which results from doing something well and the sense of achievement and progress which comes from being "on top of your job". (8)

The social needs relative to the on-the-job situation are primarily human-to-human relations and friendships on the job by a sense of identification and belonging, and of working together. Positive employee motivation, depends in large part upon the atmosphere of the employing organization and the broad personnel management and human relations objectives and abilities of key managers. The attitudes which an individual has toward the organization would therefore, seem to depend on how that person perceives the actions of the organization in satisfying his needs. Raudsepp (1967) tells us that pressure placed on the scientist for organizational conformity reduces efficiency and is oppressive to creative thinking. A conforming atmosphere is disastrous to vitality and vigorous progress in the engineering and scientific fields inasmuch as overly organized procedures choke enterprise and initiative. Where these practices prevail, studies have shown that engineers and scientists are the most dissatisfied employees as they are in direct conflict with the conformist character of the private sector industrial and business system.

Studies by Hertzberg (1968) and others have clearly shown that certain maintenance factors, such as salaries and working conditions, by themselves do not satisfy the worker. If not at an acceptable level, these factors will cause a worker to be dissatisfied, but

increasing their amounts will not buy employee satisfaction or motivation. Herzberg believes that the key to job satisfaction lies within the nature of the work itself, and to satisfy the employee it is necessary to make the job more challenging and intrinsically rewarding to the individual. Studies of engineers and scientists have shown, as a group, they require such types of work if they are to be self-motivating employees. The modern objective is to make all job tasks, even those on assembly lines, as broad or as varied as possible. The primary objective is to offer the worker a challenge. Herzberg defines these needs in terms of job-satisfaction and defines the need for job-satisfaction as a feeling. He claims that in examining job-satisfaction or job-dissatisfaction: "these two feelings are not opposites of each other." He further states that: "the opposite of job-satisfaction is not job-dissatisfaction but rather, no job-dissatisfaction." There is only a question of semantics, e.g. "What is not satisfying must be dissatisfying, and vice versa." Again the explicit need for challenge in the job environment is seen. The concept of job enlargement is based on growth or motivation factors intrinsic to the job. In simple terms, the work itself, responsibility, and growth or advancement. The ultimate goal is the prevention of automated humans.

Roach and Davis (1973) developed a hierarchical structure and implied an organization of an employee attitude system with a general orientation divided into two somewhat less general orientations. These were representative of what the employee perceives and what his attitudes are toward company management and its

policies or reward for his job efforts. They also revealed how the individual perceives his personal needs being fulfilled. The outcome showed that:

> The personalized need fulfillment appears to separate into need fulfillment that is obtained from the immediate work environment, such as the job itself, co-workers, job freedom, etc., and corporate provided need fulfillment that is obtained from the general organizational environment, such as a fair and interested management and organization with which they can identify and in which they can have pride (p. 185).

It can, therefore, be concluded that the motivational resources of an organization are no more than depositories of the "need - satisfactions" which are part of work. There are, in effect, two distinct and basic requirements: The organization must be able to provide people with some satisfactions, and secondly but most significant, the organization must have the ability to program these satisfactions in order to develop a one-to-one relationship with productivity.

Organizational Perceptions

As Mosel (1968) put it, "Scientists are not different from other people, they just act differently. Why? Because the nature of the enterprise in which they are involved requires them to act differently". It becomes obvious then, that should the classical management system be introduced suddenly into the "think-tank" R&D environment, it would collapse with a sudden halt to all creativity and problem solving. R&D personnel, therefore, tend to view themselves as being different in goals and needs (Danielson, 1960). It is interesting to note that 60% industrial engineers and scientists indicate a belief that they are different as a group from other workers. (Bogaty, 1969:13).

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Engineering and scientific personnel have a tendency toward being self-pacing as compared to the industrial non-professional worker who is "machine-paced", individualistic rather than standardized, and reflective and creative rather than routine. In the research and development organizational climate, therefore, the productivity and quality of ideals generated might be expected to be related to the motivational level of the engineers and scientists. The most effective motives for creative professionals are found within the engineers and scientists themselves. Research (Goodman, et al, 1970; Badowy, 1971, Bogaty, 1969; and Dysinger, 1966) has established that this group will be self-motivating provided a suitable and favorable organizational climate for its exercise is present. Organizational climate, therefore, includes not only descriptions of situational characteristics, but also individual differences in perception and attitudes (James & Jones, 1974:1103).

When dimensions of organizational life such as openness of communication, supportiveness, degree of participation and influence, democratic administration, and the like, are grouped under the heading or organizational climate, it has been found that a relationship exists between organization climate a relationship and performance in addition, a relationship was also found to exist between organizational climate and job satisfaction. Guion (1973) argues that the relationships between perceived organizational climate and job attitudes found by Johannesson (1973) indicate that perceived organizational climate is more a function of individual attributes than of organizational attributes. An interesting question posed at this point is whether

climate is a cause or a consequence of performance and satisfaction. In an effort to define the construct "climate", Schneider (1973) conceptualized it as an "intervening variable" because it was caused by discrete experiences (both organizational and individual) and, in turn, caused later behaviors. Organizational climate is also seen as an individual attribute. However, as pointed out by James and Jones (1974:1107) there are many criticisms of the concept of organizational climate as a perceived organizational attribute. He also suggests that "these arguments are equally appropriate for climate as a perceived individual attribute".

We must therefore, reconceptualize the construct of climate in order to differentiate between the constructs of organizational attributes and individual attributes. James and Jones (1973:1108) suggest that a new nomenclature such as "psychological climate" be employed and applied to the "perceptual measurement - individual attribute" approach. England (June 1967:116) first recognized this concept in his finding that personal value variables accounted for none of the resulting goal differences than did organizational goal variables. This suggests that an organization's goals may be more related to personal values than to broad goals of the organization. In other words, attention needs to be paid to the determination of interaction between conditions of the organization and various individual characteristics which lead to a particular perceived or psychological climate. In addition, separating organizational climate and psychological climate into discrete constructs permits "assessment of the differential importance of these two sets of variables in

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predicting both individual attitudes and behaviors and performance of an organizational or group level" (James & Jones 1973:1109).

The thrust of this study differentiates organizational climate from psychological climate. Within the context of this research, organizational climate refers to "operative goals" (or organizational attributes) whereas psychological climate refers to "personal values" (or individual attributes) which can be defined, in more specific terms, as the intervening psychological process whereby the individual translates the interaction between perceived operational goals and individual characteristics into a set of values. In the context of the work of England (March 1967) there is a growing belief among researchers that personal values are important in the comprehension of the behavior of engineers and scientists. Personal values are divided into two major categories: "operative values" and "intended and adopted values". The former having the greatest influence on behavior and the latter being those that may be contended but do not have much of an influence on behavior. Values are a prime influence on behavior and research has shown that value "differences" exist between engineers, scientists and managers; but these differences are not as great as is generally believed (Taguri, 1965:40).

III. METHODOLOGY

The methodology used in this study is similar to that used by Manley et al (1974) and Pittenger, (1973) and leans heavily on the work of George W. England of the University of Minnesota and Taguri (1965). The application of England's (1967) value systems to an R&D organization which was originally conceived by Dr. T. Roger Manley of the Air Force Institute of Technology, Wright-Patterson AFB, and is the basic thrust of this study. The processes by which the value concepts and goals used in this study were developed have been described in detail elsewhere in this paper and have also described fully by Manley, et al (1974).

Questionnaire Design and Construction

For this study 73 different value concepts, all determined to be relevant to R&D personnel, were used to examine the personal value systems of engineers, scientists, and managers in the R&D organization participating in this study. The basic approach was first used by England (1967), however, Manley, et al (1974), after an extensive review of the research management literature, refined England's approach reducing 214 concepts to 82. Further refinement reduced this quantity to the number of concepts used in this study.

The manner in which these concepts and goals were presented to the respondent have been fully described by Manley, et al (1974:63-67),

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however, they are repeated here for the benefit of the reader. Figure 1 illustrates the means by which the concepts and goals were submitted to the respondents.

FIGURE 1

QUESTIONNAIRE FORMAT

Objectivity

High   Low
Importance   ___ ___ ___   Importance
                 X   ___ ___

                 2 pleasant

                 3 successful

                 1 right

In this example a hypothetical respondent has ranked the concept Objectivity as being of high importance to him. In indicating which descriptor best describes the meaning of the concept to him the respondent has placed a "1" next to the descriptor "right". By so doing so he has indicated that "right", of the three descriptors presented, best describes the meaning of the concept to him. Also, he has indicated that "successful" (assigned a "3") least describes the meaning of the concept to him; while "pleasant" falls somewhere between the two.

Although it may not be immediately apparant, this evaluation scheme allows each concept (or goal) to be placed in one of the nine cells of a 3x3 matrix. This valuation matrix is presented in Figure 2. Note that the columns represent the Importance or Power Mode of

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Valuation, and the rows the Secondary or Descriptor Mode.

Behavioral relevance, or the measure of it, is determined by first noting the number of concepts assigned to the three high importance cells. (In the example given in Figure 1 on the previous page, the concept would be assigned to cell 7 -- Objectivity was rated "high importance" and the "1" was placed next to "right".) One the high importance cell with the largest number of concepts assigned to it has been identified, that number is then compared with what we refer to as its complement; that is, the sum of the total of concepts contained in the average and low importance cells in the same row. If the number of high importance concepts is greater than or equal to its complement, the individual is described as having a defined primary value orientation. If the complement is greater, the individual is described as having a Mixed orientation.

This process can be described in somewhat more rigorous terminology utilizing the theory of conditional probability. In the first step we identify the largest of three conditional probabilities: the probability that a respondent would assign a "1" to the descriptor pleasant, given that the concept has received a rating of high importance, $P(P/HI)$; the probability that a "1" would be assigned to successful, given a rating of high importance, $P(S/HI)$; and the probability that a "1" would be assigned to right, given a rating of high importance, $P(R/HI)$.

FIGURE 2

VALUATION MATRIX

	High Importance	Average Importance	Low Importance
Pleasant	(1)	(2)	(3)
Successful	(4)	(5)	(6)
Right	(7)	(8)	(9)

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The next step would be to compare the largest of the above probabilities with its complement; e.g., compare $P(R/HI)$ with the probability of responding right given an importance rating of Not High Importance, $P(R/\overline{HI})$. If the former is larger than or equal to its complement, the descriptor is considered to establish the individual's primary orientation.

Aside from Mixed (no identified primary orientation) we recognize three classes of primary value orientations: Affect, Pragmatic, and Normative. If:

$P(P/HI) \geq P(P/\overline{HI})$ = an Affect primary orientation;

$P(S/HI) \geq P(S/\overline{HI})$ = a Pragmatic primary orientation;

$P(R/HI) \geq P(R/\overline{HI})$ = a Normative primary orientation;

however, if the complement is larger, as already noted, the individual is described as having a Mixed, or no identified primary value orientation.

The identification of an individual's primary value orientation is crucial, for the measure of behavioral relevance used in this research and mentioned repeatedly throughout this report is the joint rating of high importance and a "1" assigned to the descriptor consistent with the established primary orientation of the individual. England, et al (1969:66) presents this symbolically:

$$B_V \rightarrow f(I \cap PO)_C$$

"...the behavior of an individual, insofar as behavior is a function of values, is best indicated by the joint function of those concepts he considers important and which fit his primary orientation."

It should be understood that except for noting the assignment of a high importance rating, those individuals with Mixed orientations are excluded from contributing to the behavioral relevance scores of value concepts and goals. High importance ratings alone, which include Mixed orientations, are used only as tie breakers in the hierarchical ranking of concepts or goals which have behavioral relevance rankings.

Analysis Methodology

The primary analytic tools used to analyze the data were the Rank Difference Correlation Coefficient (or Spearman Rank Correlation) and the Contingency Table Analysis (often referred to as chi-square analysis). These modes of testing were chosen because they are non-parametric or distribution-free in that they do not assume that the scores under analysis were drawn from a population distributed in a certain way (Siegal, 1956:VII) and no assumptions need to be made with regard to the shape of the distribution of the frequencies that are being tested.

In order to establish compatibility with other research done in this field, a 0.05 level of significance is utilized. Therefore, in this research for the chi-square analysis, a null hypothesis that two variables were independent was rejected if the chi-square statistic calculated from the applicable table was greater than the critical chi-square value of the 0.05 level of significance with the appropriate number of degrees of freedom obtained from the applicable tables.

The Spearman Rank Correlation was tested at the 0.05 level of significance to test for dependencies between ranks. This

was performed to determine whether or not the variables are associated in the population. This was done in conjunction with a test of the null hypothesis that the variables under study are <u>not</u> associated in the population and that the observed value of r_S differs from zero only by chance.

IV. ANALYSIS OF DATA

The basic data collected and extracted from each questionnaire
are presented and discussed in detail in this chapter.

Demographic Variables

The demographic variables used in this research are listed
in Part II of the questionnaire (APPENDIX). The medians of the vari-
ables that may be of immediate interest are the following:

Years with Organization: 13 years

Time as a Research Manager: 4 years

Time as a Research Scientist or Engineer: 15 years

Age: 41 years

Average Education: Masters Degree

Period in which last Degree was earned: 1969-1974

Annual Income: $20,000 to $24,999.

General Job Satisfaction

Questions 14, 15, 16 and 17 in Part III of the questionnaire
(APPENDIX) were designed to determine the satisfaction level percentage
of the respondents according to professional category and by total re-
spondents. These data are presented in tables I through IV. An exam-
ination of the satisfaction and dissatisfaction leads to the conclusion
that factors such as organizational goals, type of work performed,
personal values, etc. are more significant determinants of the attitude
of engineers, scientists and managers.

The satisfaction scores of all respondents were tested using analysisof variance to determine whether or not the three professional groups had the same satisfaction levels. The null hypothesis ($Ho:M_1=M_2=m_3$) was tested against the hypothesis that satisfaction differences exist (H_1: not HO). A level of significance of 0.05 was used for this test. Based on the obtained F ratio of 3.45 (df=139), the null hypothesis is rejected. It is evident therefore, that satisfaction differences exist between the professional groups at this R&D organization; however, in calculating the strength of the statistical relation from the one-way analysis of variance ($_\omega2$), only 0.4% of the variance in the dependent variable seems to be accounted for by the independent variable. This confirms a weak association between groups.

TABLE I

How Well Respondents Like Their Jobs

Indicator	Engineers	Scientists	Managers	All
Hate It	1	0	0	1
Dislike It	2	0	0	1
Don't Like It	18	20	11	16
Indifferent	12	7	14	17
Like	47	46	21	42
Enthusiastic	19	20	36	22
Love It	1	7	18	5

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TABLE II

How Respondents Thought They Compared to Others

Indicator	Engineers	Scientists	Managers	All
No one likes his job better than I like mine	0	13	7	3
I like my job much better than most people like theirs	9	13	29	14
I like my job better than most people like theirs	34	47	21	32
I like my job about as well as most people like theirs	48	20	36	42
I dislike my job more than most people like theirs	8	7	7	8
I dislike my job much more than most people like theirs	0	0	0	0
No one dislikes his job more than I dislike mine	1	0	0	1

TABLE III

How Much of the Time Each Respondent Felt Satisfied With His Job

Indicator	Engineers	Scientists	Managers	All
All of the time	0	7	7	2
Most of the time	24	33	54	31
A good deal of the time	25	20	10	21
About half the time	34	13	25	30
Seldom	16	27	4	15
Never	1	0	0	1

TABLE IV

How Respondents Feel About Changing Their Jobs

Indicator	Engineers	Scientists	Managers	All
Would quit this job at once if could get anything else to do	1	0	0	1
Would take almost any other job in which I could earn as much as I am now	4	0	0	3
Would like to change both my job and my occupation	6	13	7	7
Would like to change my present job for another job	23	20	7	19
Am not eager to change my job, but would do so if I could get a better job	57	53	75	60
Cannot think of any other job for which I would exchange	6	7	4	6
Would not exchange my job for any other	3	7	7	4

Values

The distribution of orientations for each professional specialty is listed in Table V. As can be observed from the table, primary orientations were identified for 63% of all professionals responding to the questionnaires. In comparison to England's (1967) findings and Manley's (1972, 1974) findings, the personnel participating in this study turned out to have a nearly equal Mixed or no primary orientation. A chi-square test for independent samples to determine the significant differences between the groups was performed. It was found that, because of the almost equal proportions of managers, scientists and engineers with identifiable primary orientations, there was no significance. Primary orientation is, therefore, independent of professional specialty for the R&D professionals surveyed at this organization.

The review of the comparison of hierarchical rankings of both values and goals across professional specialties is one of the interesting aspects of this research, especially when compared to the results obtained by Manley (1974). A ranking of personal value concepts is shown in Table VI. These are the value concepts delineated in part I of the questionnaire (APPENDIX). The Table is arranged to show the overall ranking of all professionals of each value concept, and its relative ranking by each professional group.

From Table VI it can be seen that there are a number of concepts for which a significant intergroup dispersion exists in the relative ranking concepts. An example of this dispersion can be seen in the respective rankings of the concept Creative Work

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TABLE V

Orientation by Occupational Specialty

Orientation	Managers	Scientists	Engineers	All Professionals
Mixed	10 (36%)	7 (47%)	35 (36%)	52 (37%)
Affect	0 (0%)	1 (7%)	6 (6%)	7 (5%)
Pragmatic	7 (25%)	2 (13%)	23 (24%)	32 (23%)
Normative (Moral-Ethical)	11 (39%)	5 (33%)	33 (34%)	49 (35%)
Established Primary Orientation	18 (64%)	8 (53%)	62 (63%)	88 (63%)

Environment, Atmosphere. Overall it was ranked fifth; however, managers ranked it 37th, scientists second and engineers fourth. There were marked differences in 'the ranking of most of the concepts and only a few were ranked with any similarity. A Spearman Rank Correlation test was performed (Seigal, 1956:204) to show the measure of similarity or dissimilarity of the ranking among proessional specialties. The correlation coefficients were: Between Managers and Scientists: .50; Between Managers and Engineers: .79; Between Scientists and Engineers: .50. The higher correlation between managers and engineers was not unexpected inasmuch as the majority of managers were selected from the ranks of engineers. The coefficients were tested for independence and independence was rejected at the .0005 level of significance using the Kendall Significance Test (Siegal, 1956:212). The result of this test indicated that there was dependence between the different professional specialty groups in their ranking of value concepts.

In examining the ranking of the value concepts delineated in Table VI, it can be observed that there are specific similarities and differences within the first quartile (highest 20 concepts) values.

Ranked in the first quartile by all groups were:

1. My Co-worker

2. My Boss

3. Cooperation

4. My Profession

5. Success

6. Self-expression

7. Job Security

8. Attitudes of Higher Management

9. Rewards Commensurate with Accomplishments and,

10. Prestige

Ranked in the first quartile by managers and scientists:

1. Freedom to identify and solve problems in your own way.

2. Human relations skills for research managers and,

3. Money, competitive salary.

Managers and engineers ranked the following in the first quartile:

1. Job satisfaction

2. Challenge

3. Recognition by higher management, and

4. Stability

Engineers and scientists shared only one concept, Creative Work Environment, Atmosphere.

Those value concepts placed in the first quartile by managers only were:

1. My subordinates

2. Achievement, and

3. Management's objectives

Included in the upper quartile of scientists only were:

1. Intelligence

2. Technical Knowledge of Supervisor

3. Benefits of Research and Development, and

4. Initiative

Finally, engineers above included the following concepts in their upper quartile:

1. Personal objectives
2. Team work
3. Knowledge, and
4. Innovation; Creativity

In comparison, Kirchner (1975) reported that as a result of a survey done on 320 engineers at a large mid-western Fortune 500 company, it was found that there was a high correlation between individuals morale and group morale. The result showed statistically that there were three basic factors of concern to the engineers; these were, in order of importance: (1) supervision; (2) job satisfaction; and (3) advancement and recognition. Herzberg's (1965) engineers' sequence of important motivators is: achievement, recognition, work itself, responsibility, advancement and salary. Thus it can be seen that there are differences in ranking of concepts from organization to organization between public sector and private sector. These different results are undoubtedly related to the variant populations examined, to differences in the implements and methodologies used, and the variegations in interpretations and view points of the investigators. It would, therefore, be inappropriate at this point to attempt to draw any generalized conclusions as to the personal value systems of R&D professionals solely on the basis of these data.

The results do suggest, however, that while the basic attitudinal dimensions appear to be quite stable, their organization into an attitudinal system is more susceptable to change. In addition, the

hierarchical structure obtained in these analyses implies an organization of an employee attitude system within the organization.

TABLE VI

Ranking of Value Concepts

Rank Overall n=140	Value Concept	Rank by Managers n=28	Rank by Scientists n=15	Rank by Engineers n-97
1.	My Co-workers	5	1	1
2.	Job satisfaction	1	31	2
3.	My boss	7	6	3
4.	Cooperation	2	15	5
5.	Creative Work environment, atmosphere	37	2	4
6.	My profession	10	12	8
7.	Challenge	12	46	6
8.	Personal objectives	22	32	7
9.	Success	8	18	10
10.	Self expression	17	13	9
11.	Job security	9	4	15
12.	Attitudes of higher management	11	8	16
13.	Recognition by higher management	4	56	13
14.	Rewards commensurate with accomplishment	15	14	14
15.	Team work	33	41	11
16.	Prestige	6	9	17
17.	Stability	4	24	12
18.	My subordinate	3	23	25
19.	Freedom to Identify and solve problems in your own way	16	10	22
20.	Human relations skills for research managers	17	5	27
21.	Intelligence	39	3	26
22.	Maturity	23	63	19
23.	Knowledge	45	7	20
24.	Innovation, Creativity	48	33	18
25.	Dignity	26	16	28

TABLE **VI** (Cont)

Ranking of Value Concepts

Rank Overall n=140	Value Concept	Rank by Managers n=28	Rank by Scientists n=15	Rank by Engineers n=97
26.	Achievement	13	21	36
27.	Individuality	27	49	21
28.	Money, Competitive salary	18	20	33
29.	Tolerance	36	40	23
30.	Promotions	21	52	30
31.	Loyalty	20	70	31
32.	Communication with Management	32	30	29
33.	Rationality	53	60	24
34.	Management objectives	11	65	44
35.	Participation in project selection	25	53	32
36.	Management policy and administration	28	48	34
37.	Compatibility of personal and organizational goals	35	28	35
38.	Skill	29	26	39
39.	Technical leadership	46	44	37
40.	Technical knowledge of supervision	44	11	40
41.	High productivity	49	39	41
42.	Management ability as supervisors	34	36	48
43.	Peer evaluation of research	51	67	38
44.	Foresight	30	51	48
45.	Benefits of research and development	38	19	49
46.	Delegation authority and responsibility	40	64	47
47.	Engineers	41	42	52
48.	Scientific objectivity	31	62	52
49.	Establishing goals for the individual	66	50	43
50.	Impact of research on society and the physical environ.	65	57	42

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TABLE IV (Cont)

Ranking of Value Concepts

Rank Overall n=140	Value Concepts	Rank by Managers n=28	Rank by Scientists n=15	Rank by Engineers n=97
51.	Dedication	55	25	58
52.	Ability	64	54	46
53.	Computer and library support	57	38	50
54.	Financial support of my work units	42	37	62
55.	Initiative	43	17	60
56.	Preventing obsolescence of personnel	61	43	51
57.	Interdisciplinary research	52	27	59
58.	Tangible benefits of research of society	60	47	54
59.	Measuring performance against individual goals	56	55	56
60.	Tangible benefits of research of organization	69	59	55
61.	Freedom to disclose research results	67	66	57
62.	Continued support of proven researchers	54	35	64
63.	Establishing research goals	59	45	63
64.	Scientific/Technical background for research managers	62	29	68
65.	Managem background for research managers	70	34	69
66.	Establishing goals for the organization or department	71	58	61
67.	Judgement	72	73	65
68.	Change	50	22	72
69.	Support of new researchers	63	61	66
70.	Scientists	68	68	67
71.	Ambition	73	70	70
72.	Responsibility	47	72	71
73.	Aggressiveness	57	69	73

Operative Goals

In addition to the 73 values studies by this research, 35 operative goals are also recognized as a contributing factor toward job satisfaction. In actuality there are two specific types of goals: Official and Operative. Official goals can be defined as those set by management and higher authority or regulation whereas operative goals are those goals "underlying major operating policies, management control systems". The operative goals are the basis for the day-to-day decisions made by organizational personnel. Determination of operative goals is made by personal observation of every day life in the organization of its members.

The 35 operative goals listed in Part II of the questionnaire are delineated in Table VII in order of hierarchical ranking. The overall ranking by all participants is listed in the extreme left hand column and the relative ranking by individual professional group is listed in the three right hand columns. The Spearman Rank Correlation coefficients for between group rankings are:

a. Between managers and scientists: 0.20

b. Between managers and engineers: 0.68

c. Between scientists and engineers: 0.33

The correlation coefficient between professional groups were tested for independence and it was found that between managers and scientists there was independence in ranking of the goals, between managers and engineers independence was rejected at the .0005 level of significance which indicated high dependence between these groups in their ranking of goal concepts. However, between engineers and scientists

independence was rejected at .05 level of significance indicating some dependence in their ranking of goal concepts. In the ranking of goals by professional specialties there were eight instances (22%) where more than nine positions (quartile range separated the ranking of at least two of the groups). There were six cases (17%) where the separation exceeded 18 positions.

There is a congruity in the wide swings between groups in the ranking of both value and goal concepts in the quartiles, especially between managers and scientists. The disagreements are interpreted as an incongruence of the most behaviorially relevant operative goals. This situation evidence potential discord and possible conflict should the organization continue its present course.

TABLE VII

Ranking of Operative Goals

Rank Overall n=140	Operative Goals	Rank by Managers n=28	Rank by Scientists n=15	Rank by Engineers n=97
1.	Provide employee well-being, job satisfaction	3	2	1
2.	Make working conditions enjoyable and pleasant	1	6	2
3.	Maintain a creative work environment	6	3	3
4.	Receive recognition of achievements from parent organization or upper management	8	1	6
5.	Provide job security for personnel	5	8	4
6.	Recognized and reward ability, achievement, or innovation	2	32	7
7.	Assure fiar promotion policies	4	15	10
8.	Provide benefits to mankind	17	13	5
9.	Provide fair and equitable employee compensation	9	12	8
10.	Prevent professional obsolescence of personnel	34	11	9
11.	Maintain organizational stability	10	24	11
12.	Maintain close liaison with principal investigators	19	30	12
13.	Maintain an accurate and timely description of current research and document research results in appropriate research management information systems	12	14	13
14.	Develop a reservoir of expertise and talent to handle new technical problems as they arise	28	33	14

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TABLE VII (Cont)

Ranking of Operative Goals

Rank Overall n=140	Operative Goals	Rank by Managers n=28	Rank by Scientists n=15	Rank by Engineers n=97
15.	Assure frequent working level interaction with laboratories, product divisions, and using agencies	21	4	21
16.	Promote continued professional development	16	31	16
17.	Attract high quality professional and technical personnel	13	35	15
18.	Accomplish the organizational goals as identified by the director	7	11	18
19.	Acquire a continuing or increasing budget	23	5	24
20.	Participate in establishing research priorities	18	29	17
21.	Dissemination of research results	22	7	20
22.	Allocate funds and support to programs most relevant to U.S. Army needs	32	10	23
23.	Emphasize excellence in research results	20	32	19
24.	Achieve greater organizational efficiency	29	14	22
25.	Provide increased return on the research investment	11	26	26
26.	Foster high quality of research	27	9	28
27.	Provide communications between parent organization and the scientific community	24	20	29
28.	Participate in evaluation of proposals and selection of funded research efforts	25	25	31

TABLE VII (Cont)

Ranking of Operative Goals

Rank Overall n=140	Operative Goals	Rank by Managers n=28	Rank by Scientists n=15	Rank by Engineers n=97
29.	Attract high quality extramural researchers	35	27	30
30.	Provide service to related organizations	15	18	32
31.	Contribute to the success of the parent organization	30	16	25
32.	Contribute to the national defense	33	23	33
33.	Determine significance of foreign scientific developments to U.S. Army Intelligence Community	14	22	25
34.	Determine significance of foreign scientific development to U.S. Army operational elements	31	21	34
35.	Encourage transition of basic research efforts to applied research organization	26	28	27

Value Dependencies

Using the chi square analysis, eleven demographic variables that were considered to have the greatest impact on each of the 73 value concepts were tested for independence. Of the 803 tests of the rating of the value concepts, dependence was established at a significance level of .05 or better in 755 (94.02%) of the cases.

Table VIII presents established dependencies between value concepts and "professional specialty" and includes the level of significance as well as the percentage of each of the three professional groups assigning the highest relevance score to the concept.

In examing Table VIII, one's attention is probably first attracted by the variation of percentage scores assigned to the various concepts by each group, although the highest scores for which dependencies are established are exhibited by the scientist group. Of the ratings assigned to the concepts by the scientist group, the only ones that appear to be of significance (greatest difference between groups) are: (1) Technical knowledge by supervisor; (2) Rewards Commensurate with Accomplishments; (3) Management background for Research Managers; (4) Scientific/ Technical background for Research Managers; and (5) Continual Support of Proven Researchers.

42.1

The only concept within the engineer group that appears to be significant is that of Establishing Goals for the Organization or Department. Instinctively, one might attempt to predict that managers would assign the highest rating to this concept. However, that predictive thinking would have, in all probability, predicted the same for the concept: Tangible Benefits of Research to Organization.

It is important to emphasize again that managers at this installation are for the most part, former engineers themselves. This fact has been reasonably well established by the similarities in a large number of cases in their relative rankings. The most unusual concept rating is the high rating by managers to Scientific Objectivity. Again, if one were to rely only on intuition, one might consider that this value concept would be more appropriate as a scientist value concept. This serves to reemphasize that statistical data and not intuition are the key to development of the resulting 21 dependencies shown in Table VIII. In many cases the almost equal percentages of engineers holding a given value concept as motive can be related in part to the higher percentage of engineers having a mixed orientation. However, this does not account for all of the differences. From the fact that only 29% exhibited differences in level of behavorial relevance at the .05 level of significance, it is concluded that there is strong statistical evidence that there

are some differences in the value systems of the scientists, engineers, and managers within this organization. It seems apparent from the rankings that neither of these groups have internalized those concepts which would effect a more efficient, smoother functioning organization. The predominantly engineering background of the managers seems to be reflected in the similarities of the ratings assigned by each group. Recall that the Spearman Rank Correlation Coefficient for rank ordering of the value concepts by the two groups was 0.79.

These data seem to indicate that scientist are more apt to be classified as "maintenance seekers" than are engineers or managers. In contrast to Manley and Pittenger's study (1972), the scientists in this research function primarily in a support capacity to the engineers. The data presented in Table VIII also confirms the orientations of managers as normative and that of the scientists and engineers as mixed.

TABLE VIII

DEPENDENCIES BETWEEN VALUE CONCEPT RATINGS AND CATEGORIES OF PROFESSIONAL SPECIALTY

Value Concept	Level of Significance	Professional Specialty		
		Scientist	Engineer	Manager
Rationality	(.05)	0	14	4
Dignity	(.00001)	20	19	11
Change	(.02)	27	6	7
Rewards Commensurate with Accomplishment	(.001)	13	19	14
Technical Leadership	(.01)	7	10	4
Scientific Objectivity	(.01)	0	5	11
Support of New Researchers	(.01)	0	4	0
Computer and Library Support	(.001)	7	11	7
Financial Support of My Work Unit	(.01)	14	5	11
Inter-disciplinary Research	(.02)	20	7	14
Technical Knowledge of Supervisor	(.05)	26	11	4

TABLE VIII

DEPENDENCIES BETWEEN VALUE CONCEPT RATINGS AND
CATEGORIES OF PROFESSIONAL SPECIALTY

Value Concept	Level of Significance	Professional Specialty		
		Scientist	Engineer	Manager
Measuring Performance Against Individual Goals	(.01)	20	7	4
Management Ability of Supervisors	(.015)	14	10	7
Establishing Goals for Individual	(.0001)	7	10	7
Tangible Benefits of Research to Society	(.02)	13	10	4
Human Relations Skill for Research Managers	(.05)	27	18	15
Tangible Benefits of Research to Organization	(.02)	0	8	4
Scientific/Technical Background for Research Managers	(.0001)	14	7	0
Establishing Goals for the Organization or Department	(.001)	0	7	0
Continued Support of Proven Researchers	(.0001)	14	5	0

Note: Figures include those individuals with identified primary orientations only.

Operative Goal Dependencies

The 35 organizational goals were also tested for independence of the percent operative compared to each of the 11 important demographic variables. Of the 385 tests for independence of the rating of the goals, all were dependent of the .05 or better significance level.

Table IX represents established dependencies between operative goals and "professional specialty" in the same manner as Table VIII. However, here we find engineers assigning higher ratings than either managers or scientists. The four exceptions: "Accomplish the organizational goals as identified by the director", "Achieve greater organizational efficiency", "Receive recognition of achievement from parent organization or uppper management", and "Acquire a continuing or increasing budget", to which scientists assign a higher rating than either of the other two groups seems to further substantiate the maintenance-seeking orientation of the scientists. In general, the margins of difference in the rating of goals appear to be greater than those in the rating of the values. Engineers and managers again exhibit similarities, with engineers giving a higher degree of internalization of organization goals. Of the individuals with identified primary orientation for the 35 operative goals, only 34% showed differences in level of behavorial

relevance at the .05 level of significance. Here again statistical

evidence is exhibited that there are differences in the concept of

operative goals among the scientists, engineers and managers at

this organization.

One rating which may be of interest is that of "Maintain

organizational stability", in the rating of this goal we see managers

and engineers with similar ratings, while scientists do not assign

any behavorial relevance. From this rating, as well as those of

several other goals which deal overtly with the survival of the

organization, engineers seem more concerned than scientists.

One possible explanation of this phenomenen deals with economics.

> It was determined that the scientists possessed
> more marketable skills, were more current in their
> disciplines, and would find it easier to obtain other employ-
> ment should the organization be abolished or suffer major
> cutbacks. Therefore, scientists felt sufficiently secure
> in their positions that they were able to exhibit indifference
> to the organization's goals. (Manley & Pittinger, 1974:37).

However, a review of the literature would seem to present a

counter-argument to the effect that a scientists loyalty to his

profession transcends his loyalty to the organization. These two

arguments may not necessarily be mutually exclusive and may both

be operative in this case.

TABLE IX

DEPENDENCIES BETWEEN OPERATIVE GOALS AND CATEGORIES OF PROFESSIONAL SPECIALTY

Operative Goal	Level of Significance	Professional Specialty		
		Scientist	Engineer	Manager
Provide Employee Well-being, Job Satisfaction	(.0001)	20	25	11
Contribute to the National Defense	(.01)	0	3	0
Make working Conditions Enjoyable and Pleasant	(.02)	7	24	18
Contribute to the Success of the Parent Organization	(.05)	0	2	2
Accomplish the Organizational Goals as Identified by the Director	(.01)	13	8	7
Provide Job Security for Personnel	(.05)	7	16	11
Maintain Organizational Stability	(.01)	0	11	11
Achieve Greater Organizational Efficiency	(.01)	7	4	0
Receive Recognition of Achievement from Parent Organization or Upper Management	(.001)	33	14	11
Provide Communication Between Parent Organization and the Scientific Community	(.001)	7	5	7

TABLE IX

DEPENDENCIES BETWEEN OPERATIVE GOALS AND CATEGORIES OF PROFESSIONAL SPECIALTY

Operative Goal	Level of Signifi-cance	Professional Specialty		
		Scientist	Engineer	Manager
Acquire a Continuing of Increaing Budget	(.01)	13	7	11
Participate in Evaluation of Proposals and Selection of Funded Research Efforts	(.02)	0	4	7

Note: Figures include those individuals with identified primary orientations only.

42.9

Value and Goal Concept Consistency

A number of operative goals and value concepts were sufficiently similar to allow direct comparision of behavioral relevance scores. These data are presented in Table X, which provides the behavioral relevance scores of goals and their associated value concepts by professional specialty. While the grouping is admittedly subjective, there is an apparent agreement among some of the various sets of scores.

It becomes evident from these data that although value and goal concepts may be organizationally specific to some degree, it is important that these concepts be analyzed in terms of the various professional specialty groupings. It is within the scope of analysis of the value and goal concepts for various groupings within the demographic characteristics such as age, years with organization, education, etc. that affords the examination of the influencing factors of each characteristic reflecting employee psychological climate and its relationship to organizational climate.

42.10

TABLE X

AGREEMENT OF GOALS WITH VALUE CONCEPTS

Goal and Value Concept	Scientists	Engineers	Managers	All
Goal: Maintain a Creative Work Environment	.20	.21	.09	.17
Value Concept: Creative Work Environment, Atmosphere	.33	.26	.04	.22
Goal: Provide Employee Well-being, Job Satisfaction	.20	.25	.11	.21
Value Concept: Job Satisfaction	.07	.38	.36	.34
Goal: Prevent Professional Obsolescence of Personnel	.07	.10	.00	.08
Value Concept: Preventing Technical Obsolescence of Personnel	.07	.07	.00	.05
Goal: Foster High Quality of Research	.07	.03	.00	.04
Value Concepts: Innovation, Creativity	.07	.14	.04	.12
Achievement	.00	.13	.14	.12
Goal: Achieve Greater Organizational Efficiency	.07	.04	.00	.03
Value Concepts: Management Policy and Administration	.13	.11	.07	.11
Technical Leadership	.07	.10	.04	.08
Teamwork	.07	.19	.11	.16
Establishing Research Goals	.07	.05	.04	.05

42.11

TABLE X

AGREEMENT OF GOALS WITH VALUE CONCEPTS

Goals and Value Concept	Scientists	Engineers	Managers	All
Goal: Provide Service to Related Organizations	.13	.04	.08	.05
Goal: Accomplish the Organizational Goals as Identified by the Director	.13	.08	.07	.08
Value Concepts: Attitudes of Higher Management	.20	.18	.18	.19
Management Objectives	.00	.08	.18	.09
Tangible Benefits of Research to Organization	.00	.08	.04	.07
Compatability of personal and Organizational Goals	.07	.10	.15	.11

Note: The numbers indicate the fraction of professional in the group who rated the goal or value high importance and primary descriptor.

42.12

V. CONCLUSIONS AND RECOMMENDATIONS

Conclusions:

One of the most salient findings resulting from this research was the fact that there was less than complete agreement between the normative descriptions of research and development professionals in the literature and the findings of this study. It was also interesting to note that there is heterogeneity within groups yet there is, at the same time, a difference between groups. In considering the findings of this research, there is an underlying thought that management would be well advised to organize research and development activities under its direction with a form that would be more suitable to the primary goal, or objectives of these activites. There is also a pressing need for taking into consideration those individual differences in orientations that are inherent in the professional groups. Recognition of the different concepts of its scientists and engineers is a useful tool in managing research as is understanding that there is an element of uniqueness associated with each organization and situation encountered.

In order for policy development to be effective at the organizational level, it needs to be guided by an intellectual understanding of all available knowledge. It is the intention of this research to provide management with an assessment relative to value and goal concepts and to provide a tool for identification of variables that could

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have impact on certain organizational changes to ultimately bring about positive outcomes in an organizational context.

Of great import in this arguement is the first quartile ranking of operative goals of all respondents (Table VIII). These goal rankings not only agree with Maslow's theoretical position on need fulfillment, but also correlate to Guion's (1958, p. 62) definition of job satisfaction which he defines as "the extent to which the individual's needs are satisfied and the extent to which the individual perceives that satisfaction as stemming from his total job situation." Of the 35 operative goals, the eight that received the highest ranking were:

1. Provide employee well-being, job satisfaction.

2. Make working conditions enjoyable and pleasant.

3. Maintain a creative work environment.

4. Receive recognition of achievement from parent organization or upper management.

5. Provide job security for personnel.

6. Recognize and reward ability, achievements or innovation.

7. Assure fair promotion policies.

8. Provide benefits to man-kind.

If these goal rankings are then compared to the satisfaction levels (Tables I through IV) a definite relationship between job satisfaction and psychological climate can be observed. It is evident that the goals of the organization and the personal operative goals of the respondents are in conflict. This observation can best be seen in the percentage (31%) of respondents who indicate a general dislike for their jobs (Table I) and the percentage of all respondents (45%) who

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reflect general dissatisfaction with the organization; especially engineers (51%) (Table III). It would seem that great concern should be taken to reverse the trend by implementing (1) improvement of the quality of working life; (2) Organizational Development programs; and (3) Management by Objectives/Results programs. The second and third may be considered as being based on assumptions regarding the values and goals of the organization.

To accomplish these ends emphasis should be placed on designing a motivational system not for "professional employees" as a single group but for either scientists or engineers. As can be seem from this research the total concept of "professionalism" as a single entity or organizing concept is misleading inasmuch as operative goals, need orientations, and value concepts of scientists were found to differ from those of engineers. Where the engineer is concerned primarily with extrinsic rewards (money, fringe benefits, title, etc.) because of his motivational orientations. The scientist is interested in intrinsic rewards. The scientist needs a system that will allow him to "receive recognition of achievement from parent organizations or upper management" with opportunities for professional growth and recognition within both the organization and the scientific profession. As for the engineer, there needs to be more opportunities for participation and involvement in managerial and technical planning and decision making in order to enhance the engineers status, influence, satisfaction and productivity.

Recommendations:

Based on the results of this study, it is recommended that a similar in-depth study of all of the R and D and Engineering elements within the Department of the Army be intitated. Such a study would provide comparative descriptions of motive values and operative goals of professionals in the various technical elements. The resulting data would provide an overview of management problems.

Inasmuch as this research did not attempt to include predictions of behaviors and attitudes such as need or job satisfaction, this would be an obvious next step for research. There are sufficient guidelines available to use as a basis for research. For example, psychological climate has been shown to correlate significantly with individual behavior and attitudes (James and Hornick, 1973; James and Jones, 1974; James, et. al., 1974; James, 1973). A proposed helpful addition to the studys referenced above would be the inclusion of the different components of values and operative goals found in this study.

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PERSONAL VALUES AND ORGANIZATIONAL GOALS QUESTIONNAIRE

This questionnaire is divided into three parts: I. Personal Values; II. Organizational Goals; and III. Personal Information. The questionnaire has been motivated by previous work by Professor George W. England, University of Minnesota, and Lieutenant Colonel T. Roger Manley, Air Force Institute of Technology.

The aim of this study is to provide information on the Personal Value System and Goals of ECOMRD personnel. Personal value systems seem to influence behavior of people in their perception of problems, interpretation of policy and organizational goals, their decision making, and acceptance or rejection of goals or objectives of the organization. Value systems have important bearing on organizational morale, motivation, and the creation and maintenance of an environment conducive to attainment of organizational goals. Better understanding of values held by subordinates, supervisors and fellow workers may improve the ability of individuals to respond to, understand the actions of, and interact with others with a minimum of pressure and friction.

Because of the number of variables being considered in this study, it is important that a relatively complete survey of personnel in your organization be obtained. As a member of the scientific community, you are aware of how vulnerable and dependent such a study is upon your cooperation. Your assistance will be deeply appreciated.

INSTRUCTIONS

You will be asked to judge, on basis of what they mean to you as an individual, the degree to which each topic and goal is: (1) important, (2) pleasant, (3) successful, and (4) right.

Rate how important a topic or goal is to you by placing an "X" in the appropriate space: the left space signifies high importance, the middle space, average importance; and the right space, low importance.

Then specify which of the three descriptors (successful, pleasant, and right) best indicates the meaning to you of the topic or goal; indicate your choice by placing the number "1" on the line next to it. Then indicate which descriptor least indicates the topic or goal's meaning to you by writing the number "3" in the space provided. Finally, write the number "2" next to the remaining descriptor. Please complete all topics and goals in this manner and check to see that the three descriptions for each topic have been ranked in the manner instructed.

<u>TOPIC/GOAL</u>

High
Importance □ □ □ Low
                     Importance

____pleasant

____successful

____right

EXAMPLE

Patriotism	Dishonesty
High Importance ☐ ☒ ☐ Low Importance	High Importance ☐ ☒ ☐ Low Importance
_2_ pleasant	_2_ pleasant
_3_ successful	_1_ successful
_1_ right	_3_ right

The above examples can be used to illustrate how the questionnaire should be completed. For example, if you felt that the topic PATRIOTISM was of average importance, you would place an "X" in the middle space as indicated. If you felt that of the three descriptors (pleasant, right, and successful) "right" best indicates what the topic means to you, you would write the number "1" next to "right". If the descriptor "successful" least indicates what the topic means to you, then you would write the number "3" next to "successful" as is shown in the example above. Then you would place the number "2" next to the remaining descriptor, in this case "pleasant".

For some of the topics or goals you may feel that none of the descriptors apply. For example, you may feel that for the topic DISHONESTY, neither "pleasant", "right", nor "successful" indicates the meaning to you. If you have this problem, you might begin by deciding which descriptor least indicates the topic's meaning to you. For example, for the topic DISHONESTY if you felt that "right" least indicates the topic's meaning to you, you would write the number "3" next to "right", and so on for the remaining descriptors as shown in the example.

Remember, you are the focus of this study. Do not concern yourself with how others might complete the questionnaire-- what is important is how you judge the topics and goals.

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PART I

PERSONAL VALUES

IDEAS ASSOCIATED WITH PEOPLE

1.
<u>Initiative</u>

High ☐ ☐ ☐ Low
Imp.   Imp.

_____ pleasant

_____ successful

_____ right

2.
<u>Judgment</u>

High ☐ ☐ ☐ Low
Imp.   Imp.

_____ pleasant

_____ successful

_____ right

3.
<u>Responsibility</u>

High ☐ ☐ ☐ Low
Imp.   Imp.

_____ pleasant

_____ successful

_____ right

4.
<u>Maturity</u>

High ☐ ☐ ☐ Low
Imp.   Imp.

_____ pleasant

_____ successful

_____ right

5.
<u>Ability</u>

High ☐ ☐ ☐ Low
Imp.   Imp.

_____ pleasant

_____ successful

_____ right

6.
<u>Dedication</u>

High ☐ ☐ ☐ Low
Imp.   Imp.

_____ pleasant

_____ successful

_____ right

7.
<u>Intelligence</u>

High ☐ ☐ ☐ Low
Imp.   Imp.

_____ pleasant

_____ successful

_____ right

8.
<u>Skill</u>

High ☐ ☐ ☐ Low
Imp.   Imp.

_____ pleasant

_____ successful

_____ right

9.
<u>Foresight</u>

High ☐ ☐ ☐ Low
Imp.   Imp.

_____ pleasant

_____ successful

_____ right

10.
<u>Rationality</u>

High ☐ ☐ ☐ Low
Imp.   Imp.

_____ pleasant

_____ successful

_____ right

11.
<u>Cooperation</u>

High ☐ ☐ ☐ Low
Imp.   Imp.

_____ pleasant

_____ successful

_____ right

12.
<u>Loyalty</u>

High ☐ ☐ ☐ Low
Imp.   Imp.

_____ pleasant

_____ successful

_____ right

13.
<u>Ambition</u>

High ☐ ☐ ☐ Low
Imp.   Imp.

_____ pleasant

_____ successful

_____ right

14.
<u>Individuality</u>

High ☐ ☐ ☐ Low
Imp.   Imp.

_____ pleasant

_____ successful

_____ right   56

15.
<u>Dignity</u>

High ☐ ☐ ☐ Low
Imp.   Imp.

_____ pleasant

_____ successful

_____ right

IDEAS ASSOCIATED WITH PEOPLE
(continued)

16. Tolerance	17. Aggressiveness	18. Change
High Low Imp. ☐ ☐ ☐ Imp.	High Low Imp. ☐ ☐ ☐ Imp.	High Low Imp. ☐ ☐ ☐ Imp.
____pleasant	____pleasant	____pleasant
____successful	____successful	____successful
____right	____right	____right

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PERSONAL GOALS OF INDIVIDUALS

19. **Knowledge**	20. **Achievement**	21. **Participation in Project Selection**
High ☐ ☐ ☐ Low Imp. Imp.	High ☐ ☐ ☐ Low Imp. Imp.	High ☐ ☐ ☐ Low Imp. Imp.
____pleasant	____pleasant	____pleasant
____successful	____successful	____successful
____right	____right	____right
22. **Job Satisfaction**	23. **Rewards Commensurate with Accomplishment**	24. **My Profession**
High ☐ ☐ ☐ Low Imp. Imp.	High ☐ ☐ ☐ Low Imp. Imp.	High ☐ ☐ ☐ Low Imp. Imp.
____pleasant	____pleasant	____pleasant
____successful	____successful	____successful
____right	____right	____right
25. **Self-Expression**	26. **Success**	27. **Challenge**
High ☐ ☐ ☐ Low Imp. Imp.	High ☐ ☐ ☐ Low Imp. Imp.	High ☐ ☐ ☐ Low Imp. Imp.
____pleasant	____pleasant	____pleasant
____successful	____successful	____successful
____right	____right	____right
28. **Prestige**	29. **Promotions**	30. **Money, Competitive Salary**
High ☐ ☐ ☐ Low Imp. Imp.	High ☐ ☐ ☐ Low Imp. Imp.	High ☐ ☐ ☐ Low Imp. Imp.
____pleasant	____pleasant	____pleasant
____successful	____successful	____successful
____right	____right	____right

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PERSONAL GOALS OF INDIVIDUALS
(continued)

31.
Peer Evaluation
of Research

High
Imp. ☐ ☐ ☐ Low
             Imp.

____pleasant

____successful

____right

32.
Recognition by
Higher Management

High
Imp. ☐ ☐ ☐ Low
             Imp.

____pleasant

____successful

____right

33.
My Co-Workers

High □ □ □ Low
Imp. □ □ □ Imp.

____pleasant

____successful

____right

34.
Attitudes of Higher
Level Management

High □ □ □ Low
Imp. □ □ □ Imp.

____pleasant

____successful

____right

35.
Management's
Objectives

High □ □ □ Low
Imp. □ □ □ Imp.

____pleasant

____successful

____right

36.
High Productivity

High □ □ □ Low
Imp. □ □ □ Imp.

____pleasant

____successful

____right

37.
Job Security

High □ □ □ Low
Imp. □ □ □ Imp.

____pleasant

____successful

____right

38.
My Boss

High □ □ □ Low
Imp. □ □ □ Imp.

____pleasant

____successful

____right

39.
Stability

High □ □ □ Low
Imp. □ □ □ Imp.

____pleasant

____successful

____right

40.
My Subordinates

High □ □ □ Low
Imp. □ □ □ Imp.

____pleasant

____successful

____right

41.
Personal Objectives

High □ □ □ Low
Imp. □ □ □ Imp.

____pleasant

____successful

____right

42.
Preventing Technical
Obsolescence   of
Personnel

High □ □ □ Low
Imp. □ □ □ Imp.

____pleasant

____successful

____right

43.
Compatibility of
Personal and
Organizational Goals

High □ □ □ Low
Imp. □ □ □ Imp.

____pleasant

____successful

____right

44.
Delegation of
Authority and
Responsibility

High □ □ □ Low
Imp. □ □ □ Imp.

____pleasant

____successful

____right

CONCEPTS ASSOCIATED WITH THE ORGANIZATION
(continued)

45. Management Policy and Administration	46. Communication with Management	47. Technical Leadership
High Imp. ☐ ☐ ☐ Low Imp.	High Imp. ☐ ☐ ☐ Low Imp.	High Imp. ☐ ☐ ☐ Low Imp.
____pleasant	____pleasant	____pleasant
____successful	____successful	____successful
____right	____right	____right

CONCEPTS REFERRING TO RESEARCH AND ENGINEERING

48. Scientists	49. Engineers	50. Teamwork
High Imp. ☐ ☐ ☐ Low Imp.	High Imp. ☐ ☐ ☐ Low Imp.	High Imp. ☐ ☐ ☐ Low Imp.
____pleasant	____pleasant	____pleasant
____successful	____successful	____successful
____right	____right	____right
51. Scientific Objectivity	52. Innovation, Creativity	53. Support of New Researchers
High Imp. ☐ ☐ ☐ Low Imp.	High Imp. ☐ ☐ ☐ Low Imp.	High Imp. ☐ ☐ ☐ Low Imp.
____pleasant	____pleasant	____pleasant
____successful	____successful	____successful
____right	____right	____right
54. Creative Work Environment, Atmosphere	55. Computer and Library Support	56. Establishing Research Goals
High Imp. ☐ ☐ ☐ Low Imp.	High Imp. ☐ ☐ ☐ Low Imp.	High Imp. ☐ ☐ ☐ Low Imp.
____pleasant	____pleasant	____pleasant
____successful	____successful	____successful
____right	____right	____right
57. Financial Support of My Work Units	58. Inter-Disciplinary Research	59. Technical Knowledge of Supervisor
High Imp. ☐ ☐ ☐ Low Imp.	High Imp. ☐ ☐ ☐ Low Imp.	High Imp. ☐ ☐ ☐ Low Imp.
____pleasant	____pleasant	____pleasant
____successful	____successful	____successful
____right	____right	____right

CONCEPTS REFERRING TO RESEARCH AND ENGINEERING
(continued)

60.
Measuring Performance
Against Individual Goals

High ☐ ☐ ☐ Low
Imp. Imp.

____pleasant

____successful

____right

61.
Management Background for
Research Managers

High ☐ ☐ ☐ Low
Imp. Imp.

____pleasant

____successful

____right

62.
Management Ability of
Supervisors

High ☐ ☐ ☐ Low
Imp. Imp.

____pleasant

____successful

____right

63.
Establishing Goals for
Individual

High ☐ ☐ ☐ Low
Imp. Imp.

____pleasant

____successful

____right

64.
Tangible Benefits of
Research to Society

High ☐ ☐ ☐ Low
Imp. Imp.

____pleasant

____successful

____right

65.
Impact of Research on
Society and the
Physical Environment

High ☐ ☐ ☐ Low
Imp. Imp.

____pleasant

____successful

____right

66.
Freedom to Disclose
Research Results

High ☐ ☐ ☐ Low
Imp. Imp.

____pleasant

____successful

____right

67.
Human Relations Skills
for Research Managers

High ☐ ☐ ☐ Low
Imp. Imp.

____pleasant

____successful

____right

68.
Tangible Benefits of
Research to
Organization

High ☐ ☐ ☐ Low
Imp. Imp.

____pleasant

____successful

____right

69.
Freedom to Identify and
Solve Problems in Your
Own Way

High ☐ ☐ ☐ Low
Imp. Imp.

____pleasant

____successful

____right

70.
Scientific/Technical
Background for
Research Managers

High ☐ ☐ ☐ Low
Imp. Imp.

____pleasant

____successful

____right

71.
Establishing Goals for
the Organization or
Department

High ☐ ☐ ☐ Low
Imp. Imp.

____pleasant

____successful

____right

72.
Continued Support of
Proven Researchers

High ☐ ☐ ☐Low
Imp. Imp.

____pleasant

____successful

____right

73.
Benefits of Research
and Development

High ☐ ☐ ☐Low
Imp. Imp.

____pleasant

____successful

____right

PART II

ORGANIZATIONAL GOALS

ORGANIZATIONAL GOALS

1. Foster high quality of research.

   High ☐ ☐ ☐ Low
   Imp.   Imp.

   ____pleasant

   ____successful

   ____right

---

2. Attract high quality professional and technical personnel.

   High ☐ ☐ ☐ Low
   Imp.   Imp.

   ____pleasant

   ____successful

   ____right

---

3. Emphasize excellence in research results.

   High ☐ ☐ ☐ Low
   Imp.   Imp.

   ____pleasant

   ____successful

   ____right

---

4. Maintain a creative work environment.

   High ☐ ☐ ☐ Low
   Imp.   Imp.

   ____pleasant

   ____successful

   ____right

---

5. Prevent professional obsolescence of personnel.

   High ☐ ☐ ☐ Low
   Imp.   Imp.

   ____pleasant

   ____successful

   ____right

6. Develop a reservoir of expertise and talent to handle new technical problems as they arise.

High ☐ ☐ ☐ Low
Imp.   Imp.

_____pleasant

_____successful

_____right

----

7. Recognize and reward ability, achievement, or innovation.

High ☐ ☐ ☐ Low
Imp.   Imp.

_____pleasant

_____successful

_____right

----

8. Promote continued professional development.

High ☐ ☐ ☐ Low
Imp.   Imp.

_____pleasant

_____successful

_____right

----

9. Provide employee well-being, job satisfaction.

High ☐ ☐ ☐ Low
Imp.   Imp.

_____pleasant

_____successful

_____right

----

10. Contribute to the national defense.

High ☐ ☐ ☐ Low
Imp.   Imp.

_____pleasant

_____successful

_____right

ORGANIZATIONAL GOALS (continued)

11. Make working conditions enjoyable and pleasant.

High ☐ ☐ ☐ Low
Imp.   Imp.

____pleasant

____successful

____right

----

12. Assure fair promotion policies.

High ☐ ☐ ☐ Low
Imp.   Imp.

____pleasant

____successful

____right

----

13. Provide fair and equitable employee compensation.

High
Imp. ☐ ☐ ☐ Low
          Imp.

____pleasant

____successful

____right

----

14. Contribute to success of parent organizations.

High ☐ ☐ ☐ Low
Imp.   Imp.

____pleasant

____successful

____right

----

15. Provide benefits to mankind.

High ☐ ☐ ☐ Low
Imp.   Imp.

____pleasant

____successful

____right

16. Assure frequent working level interaction with laboratories, product divisions, and using agencies.

High ☐ ☐ ☐ Low
Imp. Imp.

____pleasant

____successful

____right

---

17. Dissemination of research results.

High ☐ ☐ ☐ Low
Imp. Imp.

____pleasant

____successful

____right

---

18. Accomplish the organizational goals as identified by the director.

High ☐ ☐ ☐ Low
Imp. Imp.

____pleasant

____successful

____right

---

19. Provide job security for personnel.

High ☐ ☐ ☐ Low
Imp. Imp.

____pleasant

____successful

____right

---

20. Maintain organizational stability.

High ☐ ☐ ☐ Low
Imp. Imp.

____pleasant

____successful

____right 69

21. Achieve greater organizational efficiency.

High
Imp. ☐ ☐ ☐ Low
Imp.

____pleasant

____successful

____right

----

22. Receive recognition of achievements from parent organizations or upper management.

High
Imp. ☐ ☐ ☐ Low
Imp.

____pleasant

____successful

____right

----

23. Provide communications between parent organization and the scientific community.

High
Imp. ☐ ☐ ☐ Low
Imp.

____pleasant

____successful

____right

----

24. Provide increased return on the research investment.

High
Imp. ☐ ☐ ☐ Low
Imp.

____pleasant

____successful

____right

----

25. Allocate funds and support to programs most relevant to U S ARMY needs.

High
Imp. ☐ ☐ ☐ Low
Imp.

____pleasant

____successful

____right

70

26. Acquire a continuing or increasing budget.

High
Imp. ☐ ☐ ☐ Low
Imp.

_____pleasant

_____successful

_____right

----

27. Provide service to related organizations.

High
Imp. ☐ ☐ ☐ Low
Imp.

_____pleasant

_____successful

_____right

----

28. Determine significance of foreign scientific developments
    to USA intelligence community.

High
Imp. ☐ ☐ ☐ Low
Imp.

_____pleasant

_____successful

_____right

----

29. Determine significance of foreign scientific developments
    to USA operational elements.

High
Imp. ☐ ☐ ☐ Low
Imp.

_____pleasant

_____successful

_____right

----

30. Participate in evaluation of proposals and selection of
    funded research efforts.

High
Imp. ☐ ☐ ☐ Low
Imp.

_____pleasant

_____successful

_____right

71

31. Maintain close liaison with Principal Investigators.

High
Imp. ☐ ☐ ☐ Low Imp.

____pleasant

____successful

____right

----

32. Participate in establishing research priorities.

High
Imp. ☐ ☐ ☐ Low Imp.

____pleasant

____successful

____right

----

33. Maintain an accurate and timely description of current research and document research results in appropriate research management information systems (e.g. MASIS).

High
Imp. ☐ ☐ ☐ Low Imp.

____pleasant

____successful

____right

----

34. Attract high quality extramural researchers.

High
Imp. ☐ ☐ ☐ Low Imp.

____pleasant

____successful

____right

----

35. Encourage transition of basic research efforts to applied research organizations.

High
Imp. ☐ ☐ ☐ Low Imp.

____pleasant

____successful

____right

PART III

PERSONAL INFORMATION

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1. Number of years with the organization (check one):

   ____0-2 years   ____16-20 years

   ____3-5 years   ____21-30 years

   ____6-10 years   ____Over 30 years

   ____11-15 years

2. <u>Total</u> time as a research scientist or engineer (check one):

   ____0-2 years   ____16-20 years

   ____3-5 years   ____21-30 years

   ____6-10 years   ____Over 30 years

   ____11-15 years   ____Not applicable

3. <u>Total</u> time as a research manager (check one):

   ____0-2 years   ____16-20 years

   ____3-5 years   ____21-30 years

   ____6-10 years   ____Over 30 years

   ____11-15 years   ____Not applicable

4. Your age (check one):

   ____Under 26 years   ____45-49 years

   ____26-30 years   ____50-54 years

   ____31-34 years   ____55-59 years

   ____35-39 years   ____Over 59 years

   ____40-44 years

5. Formal Education (check highest completed):

   ____High School   ____Masters Level Degree

   ____Some College   ____Work Beyond Masters

   ____College Degree   ____Doctorate

   ____Some Graduate Work   ____Post Doctorate

6. College Major (check one if applicable):

_____Social Sciences   _____Science

_____Liberal Arts   _____Mathematics

_____Business Admin.   _____Other _____

                                               (Please fill in)

_____Engineering

7. Graduate Degree (check more than one if appropriate):

_____Social Science   _____Science

_____Liberal Arts   _____Mathematics

_____Business Admin.   _____Other _____

                                               (Please fill in)

_____Engineering

8. If you are a college graduate, what year did you receive your last degree? _____

9. How long since you last attended a professional development course?

_____1 year.   _____4 years

_____2 years   _____5 years

_____3 years   _____Over 5 years

                                    _____Not applicable

10. How many professional conferences did you attend last year?

_____0   _____5-6

_____1-2   _____Greater than 6

_____3-4

11. How important do you think attending Professional Meetings is?

_____1. Very important

_____2. Important

_____3. No opinion

_____4. Not important

_____5. Detrimental

12. How important do you think visiting Principal Investigators is?

_____ 1. Very important

_____ 2. Important

_____ 3. No opinion

_____ 4. Not important

_____ 5. Unnecessary

13. Present yearly income from present position (check one):

_____ Under $11,999   _____ $25,000 to $29,999

_____ $12,000 to $14,999   _____ $30,000 to $34,999

_____ $15,000 to $19,999   _____ Over $35,000

_____ $20,000 to $24,999

14. Choose the ONE of the following statements which best tells how well you like your job. Place a check mark in front of the statement.

_____ 1. I hate it.

_____ 2. I dislike it.

_____ 3. I don't like it.

_____ 4. I am indifferent to it.

_____ 5. I like it.

_____ 6. I am enthusiastic about it.

_____ 7. I love it.

15. Mark one of the following to show how you think you compare with other people.

_____ 1. No one likes his job better than I like mine.

_____ 2. I like my job much better than most people like theirs.

_____ 3. I like my job better than most people like theirs.

_____ 4. I like my job about as well as most people like theirs.

_____ 5. I dislike my job more than most people dislike theirs.

_____ 6. I dislike my job much more than most people dislike theirs.

_____ 7. No one dislikes his job more than I dislike mine.

16. Check one of the following to show HOW MUCH OF THE TIME you feel satisfied with your job.

_____1. All the time.

_____2. Most of the time.

_____3. A good deal of the time.

_____4. About half of the time.

_____5. Seldom.

_____6. Never.

17. Check the ONE of the following which best tells how you feel about changing your job:

_____1. I would quit this job at once if I could get anything else to do.

_____2. I would take almost any other job in which I could earn as much as I am earning now.

_____3. I would like to change both my job and my occupation.

_____4. I would like to exchange my present job for another job.

_____5. I am not eager to change my job, but I would do so if I could get a better job.

_____6. I cannot think of any jobs for which I would exchange.

_____7. I would not exchange my job for any other.

18. How many days where you TDY last year? (check one) :

_____1. None

_____2. 5 days or less

_____3. 6-10 days

_____4. 11-20 days

_____5. 21-30 days

_____6. 31-45 days

_____7. Over 45 days

19. Check the title which best describes your current position.

____Scientist   ____Technical Staff

____Engineer   ____Procurement

____Technical Manager   ____Administrative Staff

____Secretarial

20. How would you characterize your background?

____Scientific   ____Management

____Engineering   ____Other _____
                                                (Please fill in)

21. How long have you been in your present position? (check one):

____Under 1 year   ____6-10 years

____1-3 years   ____Over 10 years

____4-5 years

22. How many employees are under your overall supervision? (check one):

____0-3   ____25-49

____4-9   ____50-99

____10-24   ____Over 100

23. How many employees do you directly supervise? (give number):

_____

24. List civil service grade or military rank. (check one):

_____Not Applicable   _____E1 - E4

_____GS-2 - GS-6   _____E5 - E9

_____GS-7   _____2nd Lt.

_____GS-9   _____1st Lt.

_____GS-11   _____Captain

_____GS-12   _____Major

_____GS-13   _____Lt. Col.

_____GS-14   _____Col.

_____GS-15

_____GS-16 and above

THANK YOU FOR YOUR COOPERATION